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APPLICATION NUMBER: *60/537,815*
FILING DATE: *January 20, 2004*
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UNITED STATES PATENT AND TRADEMARK OFFICE · DEPARTMENT OF COMMERCE

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Express mail Label no. EL 995047877 5US

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Edward Marion	Casaccia	Carmichael, California
David Alan	Casper	Nevada City, California

☐ *Additional inventors are being named on the _____ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

METHOD, SYSTEM, AND SUPPORTING TECHNOLOGY FOR DYNAMICALLY UPDATED INTEGRATED NEWS PRODUCTION

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☐ Customer Number

OR

☒ Firm *or* Individual Name	JOSEPH S. TRIPOLI, THOMSON LICENSING INC.				
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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 13 ☐ CD(s), Number ____

☐ Drawing(s) *Number of Sheets* ____ ☐ Other (specify) ____

☐ Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees

FILING FEE AMOUNT ($): 160

☒ The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 07-0832

☐ Payment by credit card. Form PTO-2038 is attached.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☐ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____.

Respectfully submitted,
SIGNATURE _____ Date 1/20/04

TYPED or PRINTED NAME Robert B. Levy REGISTRATION NO. (*if appropriate*) 28,234

TELEPHONE 609-734-6820 Docket Number: PU040011

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

PTO/SB/17 (10-03)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 160

Complete If Known	
Application Number	
Filing Date	
First Named Inventor	Edward Marion Casaccia
Examiner Name	
Art Unit	
Attorney Docket No..	PU040011

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 07-0832

Deposit Account Name: THOMSON LICENSING INC.

The Director is authorized to: *(check all that apply)*
☒ Charge fee(s) indicated below ☒ Credit any overpayments
☐ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	160

SUBTOTAL (1) ($) 160

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims		- ** =	0	X		=	0
Independent Claims		- ** =	0	X		=	0
Multiple Dependent				X		=	0

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid **SUBTOTAL (3)** ($) 0

SUBMITTED BY Complete *(if applicable)*

Name (Print/Type)	Robert B. Levy	*Registration No. (Attorney/Agent)*	28,234	*Telephone*	609-734-6820
Signature				*Date*	January 20, 2004

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PU040011

A. Brief summary of the invention

A workflow, a series of processes, and a software and hardware system to provide single-user control of all devices and systems in a live television production.

B. Keywords: list keywords or combinations of keywords to guide patent and literature searches. Underline the most important keywords.

Switcher, Mixer, Automation, E-MEM, GPI, PVTV, VDCP, protocol, CORBA,

C. Brief discussion of the problem solved by the invention:

The invention allows for a dramatic reduction of workforce in live television production while maintaining the ability of pre-production (newsroom) personnel to input and update content using their familiar tools and systems. Existing single-user production systems terminate that ability at an arbitrary time before the beginning of the broadcast. The continuous, dynamic updating of content as well as production control commands is a key innovation as is the means for attaining it.

D. Discussion of how you or others have implemented similar things in the past, including the manner in which others have attempted to solve the problem. Point out disadvantages and weaknesses in previous practice. Include literature references where available.

ParkerVision's PVTV system was the first commercially viable offering of a single-user production control system, in this case one oriented towards television news programming. PVTV offers only a very limited interface with industry standard Newsroom Computer Systems (NRCS). This limits the utility of PVTV since long-standing NRCS technology has allowed NRCS systems to provide dynamic updating of scripts, story presentation order, production elements, and program timing to take place seamlessly throughout the production cycle from initiation of planning of the day's program through the completion of the progress.

PVTV interrupts this beneficial workflow in that it requires that the NRCS rundown and scripts be transferred to PVTV at some arbitrary time before the life broadcast begins. All subsequent changes to running order, production content, timing calculations, etc. must then be made within the PVTV system. This disables the primary tool used by newsroom personnel, the NRCS,

without offering any alternative. In fact, except for the running order of the stories and the initial loading of scripts to the teleprompter, PVTV requires all production commands, sequences, and content references to be manually added to its time line. This constitutes a step backwards in terms of information flow.

Figure 1 below illustrates how production information flows into a traditional "manual" production control room.

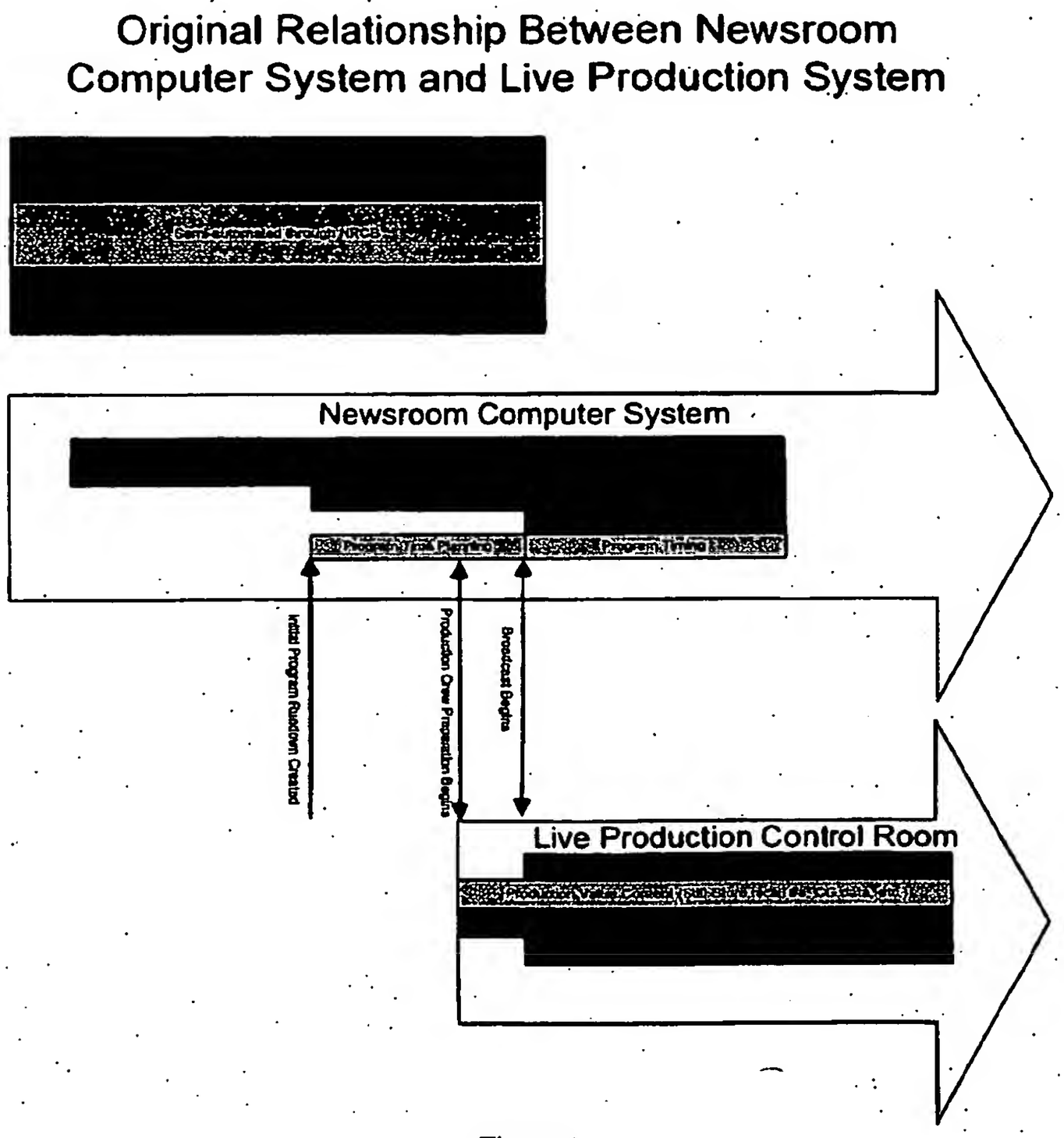


Figure 1

Key points are that the NRCS remains a functional tool throughout the on-air presentation of the broadcast, and that the program producer's ability of manipulate the content of the broadcast is maintained.. Script entries as well as changes in the sequence of stories in the program are made in the NRCS at all times, not just prior to the beginning of the broadcast. Further, the inherent functionality in the NRCS to pass some production command and content information from the script documents to the production devices is maintained. An example is entry of character generator data into scripts.

In this methodology, the majority of production commands are collated by a director or a person of similar skills and communicated either verbally or in the form of a text document to pertinent device operators.

Figure 2 illustrates how existing single-user production systems assist in some areas of live program execution while actually regressing in terms of functionality in other areas.

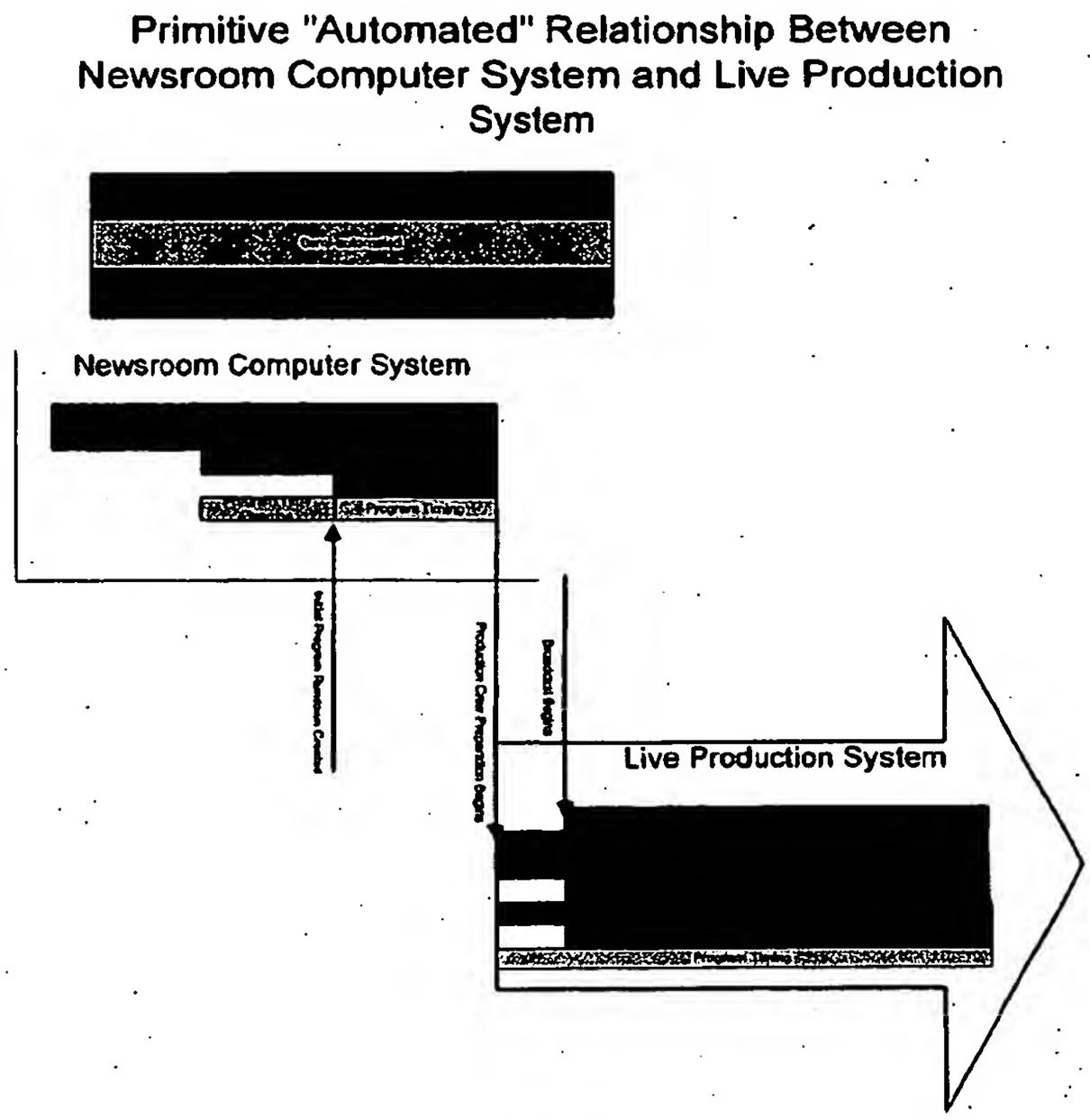


Figure 2

The first key point is that the NRCS ceases to be a useful tool except for scriptwriting at an arbitrary time prior to the beginning of the live broadcast.

At that arbitrary time, the program running order from the NRCS is transferred to the production system and all subsequent changes must take place within that production system. As in Figure 1, production commands are collated by a director or person of similar skills, and then they are manually entered into the production system. The program producer must from that point forward verbally instruct they director of any changes, and the director must in turn manually edit the production system timeline to reflect those changes.

As discussed in the Description of Invention below, these severe drawbacks can now be surmounted and additional functionality added through the employment of a dynamic exchange of data between the NRCS and the production system, elimination of the production system timeline as a controlling process, and addition of new technology that allows most if not all production commands and objects to be extracted from the NRCS without need of any human intervention.

E. Description of the invention, including one or more practical embodiments of the invention in sufficient detail to allow one with ordinary skill in the art to practice the invention. Include schematic(s), flow chart(s) and or figures to clarify operation of the invention. Point out important features and items you believe to be new. State advantages of the invention and sacrifices, if any, made to achieve these advantages. Describe any experiments conducted and the results of those experiments.

The invention is described in detail in Tsunami CRS Version 2.0 (Attachment 1), the entirety of which constitutes one practical embodiment of the invention. In the CRS and throughout this document, methods and technologies described in terms of news programming have equal applicability to other typrs of live television production

It summary form, the invention is a combination of workflow and software and hardware in support of that workflow. The result of this combination is a system in which television production information is seamlessly, automatically, dynamically, and continuously ingested from an existing system designed specifically for the creation of television content and sequencing of that content for live presentation. Such an existing system is typified by the Newsroom Computer Systems offered commercially by the Associated Press, Avid/iNews, AutoCue and several others. Users of those systems create scripts for news stories, associate other production elements such as graphics, video server files, video tapes, camera shots, etc. with those stories, and sequence those stories and their associated production elements.

The invention accesses all such information in the newsroom computer system (or other pre-production software system including commerical off-the-shelf software suites such as Microsoft Office) and stages the content for presentation as defined in the newsroom computer system sequence, allowing multiple disparate production devices to be controlled from a single point and by a single individual.

The invention is an Integrated Newsroom Production system. In common with existing news production systems it is a control system which receives news rundowns from a NRCS (such as iNews and ENPS), and uses this as the starting point for controlling connected devices including

video switchers, audio mixers, cameras and robotic pedestals, character generators. still stores, video and audio digital disk recorders, and VTRs.

What is unique about this invention is the way it does this job. It converts the running order into an event list, which is an ordered sequence of N-MEMs. Tsunami does not employ timelines, where the items in the timeline have durations, nor does it employ macros, which are stored (learned) sequences of commands to be sent to the connected devices.

The data in an N-MEM object is a snapshot of the overall state of the controlled devices. This extends the work (previously patented and trademarked by Grass Valley) on developing E-MEM technology for switchers. Where an E-MEM (Effects Memory) is a snapshot of the state of a single device used to produce a desired artistic effect on the screen, the N-MEM is a snapshot of the overall state of all the controlled devices, used to produce an overall artistic effect. An N-MEM is a set of E-MEMs

An example of such an effect, would be a TV anchor on the screen overlaid with a title on the lower part of the screen with his name on. To realize this example effect, the control system has to:

- move the camera into position
- take the camera source on the switcher background bus
- recall the CG page
- take the CG source on a switcher Key bus
- raise the audio slider for the anchor(s) microphone

and this is a very simple effect.

The overall effect is called a style. The above style is a specific instance of an N-MEM which is close-up shot of an anchor with a title superimposed. A s contains one or more N-MEMs, each of which contains the superset of possibilities for realization of the style . For the above example, the Style would have 1 N-MEM, and this N-MEM could have an E-MEM for each of the possible anchors (e.g. anchor 1 (John), anchor 2 (Fred) , and achor3 (Jane3). In turn, each of the these anchors could be taken with either camera1, 2, or 3. Thus the N-MEMs forming a style contain a range of legitimate possibilities.

Styles are created using the **Style Wizard**, which guides the operator through the process of creating these styles. These styles form the television station's overall style, it's production "look". Each of the possible E-MEMs is learned into the style. Once the set of styles is created for a station, they may be used for years without further modification, or until it is decided to change the station's on-air look.

The Producer of a news program does not need to know anything about individual E-MEMs, but can concentrate on associating styles with stories. Where there may be a bewildering array of possible E-MEMs and E-MEM combinations in a Style, there is a relatively small set of styles used in a particular show, generally less than 20.

In the workflow of producing a news program, stories or slugs are entered into the rundown, in the order they will be shown. The producer associates a Tsunami Style with each story in this rundown by employing a **software plug-in** (TAP) to the newsroom computer system. The producer further starts the process of making specific selections from the set of style possibilities for the style, starting the process denoted as N-MEM **parameterization**. For example, for one story, the producer selects Ted (Anchor 2) as the presenter, for another he parameterizes the N-

MEM by placing the text "Today in LA" as the title for a CG. Similarly he would select the clip on a video server for a SOT (sound-on-tape). The director the completes the process of parameterization, by making selections such as which camera to use, which VTR machine to use for a specific tape, which remote feed a live insert will come from, etc.

A rules checker runs in the background and checks that each story element has an associated Style, and that it is fully parameterized. Hours before the show starts, the rules checker will indicate much is incomplete, when the show starts, ideally there should be no problems indicated. The rules checker also checks for resource conflicts, and local station policies.

The event list is the list of parameterized N-MEMS that have been associated with the stories in the running order. Playout of the event list is a manual operation. At its most basic, the user presses the 'take' button. The current N-MEM is released, the next N-MEM goes on air, and the N-MEM after that is previewed. Before an N-MEM goes on air, it should be in the ready state – and the N-MEM is ready when all the controlled devices are cued. There is an E-MEM for each controlled device and each E-MEM is cycled through the states: idle, cueing, ready(cued), active (on air or on preview), and released. The N-MEM's state is a rollup of the E-MEM states, and it cycles through the states: idle, cueing, ready(cued), on-preview, on-air, and released. This is all described in much more detail in the (draft) Product Technical Specification.

On aspect of great interest is that that although what goes on air is manually paced by pressing take, the cueing of devices is performed automatically. This is different from other systems which require the cueing of a device (such as a camera move) to be manually pre-programmed onto a timeline. When an E-MEM is released, Tsunami scans forwards through the event list for the next N-MEM which has an E-MEM for the same device, and brings this into the cueing state.

The GUI shows the event list, and the state of each N-MEM, and the state of the E-MEMs. Of concern to the user during playout would E-MEM which are not cued, which would result in the overall N-MEM not being ready prior to use.

The GUI and control panel both have more buttons than the 'take' described above. There are buttons to float (skip) an N-MEM, to bring on the audio in advance of video, to hold audio after the N-MEM is released, to roll tapes and DDRs, and more. All this too is described in the Product Technical Spec.

Following an individual item through its production life:

1. A script is created in the NRCS
2. The script is selected by a producer for inclusion in a given news broadcast
3. The script is assigned a position in the sequence of stories (rundown) for that news broadcast.
4. The producer specifes the basic production treatment (sytle) of each story..
5. Various persons (writers, graphic artists, video editors, directors) add production detail to each story (N-MEM Parameterization)
6. The rundown containing the story is executed on air.
7. The N-MEMs associated with the story change the state(s) of production device when triggered to do so by the human operator.

The result of this story life-cycle is that the production information associated with each story is always current, and that it requires no intevention by the single operator of the Integrated Production System to remain current.

Supplementary Material for N-MEM Invention Disclosure

This invention is a means of making live television productions which are planned and assembled in pre-production as an ordered list of **Styles**. For production, these Styles are converted into an **Effects List** comprised of **N-MEMs** for the realization (play-out) of the show.

This means of production is effective for television shows which are highly patterned and/or scripted such as sports events, quiz shows, talk shows, and news. This document describes the generalized means of production, and then describes an instance of its usage in the field of news production.

A second invention is the grouping of an unordered set of Styles into a graphically or physically represented Style Box which can be randomly accessed. This is effective for the unordered or unscripted portions of a program such as chat sessions where the on-air performers can speak at will, or for example, the intervention of a scripted news production with unscripted live breaking news.

The creator or producer of a television program conceives and puts together the show as a series of scene elements or Styles. This set of Styles forms the on-air look of the program. As such the Styles can be created weeks or months in advance of the day of live production. Each Style is a vocabulary element of the show which when put together into the show's Style List forms its overall narrative. All television consists of simultaneous video and audio generally emanating from a video switcher and audio mixer. So there is a video mix appearing on the screen accompanied by an audio mix. A Style is the description of a particular instance of this and the N-MEM is the means of producing it.

Examples of Style are:

- a single camera shot accompanied by a single microphone input
- as above, with overlay graphics or titles from a CG
- as above with one or more video feeds overlaid in an inserted box produced by a DVE, and a more complicated audio mix
- as above with an additional musical sound track played back from an audio disk recorder
- video and audio played back from VTR or DDR
- as above, with overlaid graphics
- as above, with the recorded sound at background level, with live sound from a presenter in the foreground

The variety and nature of the Styles are limited only by the creativity of the production staff and the overall look they are trying to produce. The examples above are quite rudimentary, more complex Styles could involve:

- on-air camera zooms from long shot to close-ups
- on-air camera movements from one part of the set to another

- on-air DVE moves
- on-air switcher keyframing effects

Additionally, there is a transition into each Style. For the video this could be a simple cut, or a more complex dissolve, wipe, or DVE effect. For the audio, the new Style's audio can simply replace the previous audio mix, or be an addition or subtraction from the previous mix.

For ease of production, each Style is given a name. The show consists of the Style List. Where there is a script, the Styles are associated (embedded) with the script, and the Style List is derived (extracted) from the script or scripts.

A Style is embodied as one or more N-MEMs. A **Style Factory** manufactures the Styles themselves, and so it is the Style Factory which creates the N-MEMs. This output of the Style Factory is placed in the **Style Library**. The data in an N-MEM object is a snapshot of the overall state of all the controlled devices (including video switcher, audio mixer, cameras and robotic pedestals, character generators, still stores, video and audio digital disk recorders, and VTRs). The N-MEM extends the work (previously patented and trademarked by Grass Valley) on developing **E-MEM** technology for switchers. Where an E-MEM (Effects Memory) is a snapshot of the state of a *single device* used to produce a desired artistic effect on the screen, the N-MEM is a snapshot of the overall state of *all* the controlled devices, used to produce an overall artistic effect. An N-MEM is a set of E-MEMs. When an E-MEM is learned, the snapshot of the device is stored for later use, when an E-MEM is recalled, the saved snapshot of state is used to bring the device back to the state when the snapshot was originally taken (learned).

Creation of these E-MEMs is one of the functions of the Style Factory. However the creation of an N-MEM is much more than the creation of a single snapshot of multiple machines (which would just be a super-E-MEM). The N-MEM contains the superset of E-MEMs which reflects all possibilities for realization of the Style.

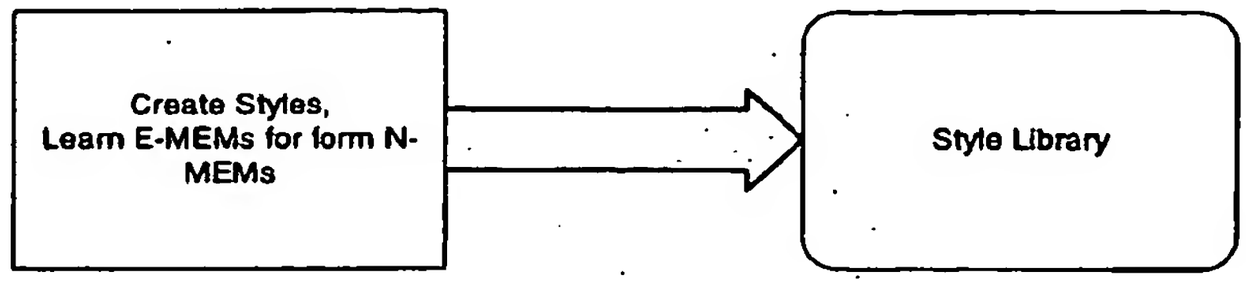
To understand this let us consider a simple example of a Style which we shall call "close-up with title". On screen would be a close-up of the on-air talent, with a title superimposed, plus audio from the performers microphone. To realize this example effect, the control system has to recall E-MEMs which at the very least:

- recalls the position of the camera (using robotic pedestal and/or pan-tilt head)
- recall the camera CCU settings and lens settings
- recall the camera source on the switcher background bus
- recall the CG page
- recall the CG source on a switcher Key bus
- recall the audio slider to the setting for the microphone

For the above example, the Style would have one N-MEM. Considering just part of this N-MEM, it could have an E-MEM for each of the possible performers (e.g. Talent-1 (John), Talent-2 (Fred) , and Talent-3 (Jane3)). In turn, each of the these anchors could

be taken with either Camera-1, Camera-2, or Camera-3. Thus the E-MEMs forming the N-MEM contain the whole range of legitimate pre-learned possibilities.

To summarize and recapitulate, the job of the Style Factory is to include all the possible E-MEMs that could be used to realize a Style into am N-MEMs which is placed in the Style Library.



STYLE FACTORY

The Producer or creative personnel planning a television program need to know nothing about E-MEMs or N-MEMs. They concentrate on associating Styles with their stories and scripts. Where there may be a bewildering array of possible E-MEMs and E-MEM combinations in a Style, there is a relatively small set of Styles used in a particular show, generally less than 20. The creative staff also makes selections such as who is on-air (i.e. who is reading the script), and the particular text for a title or other graphic. This begins the process of N-MEM **parameterization**, which is described below.

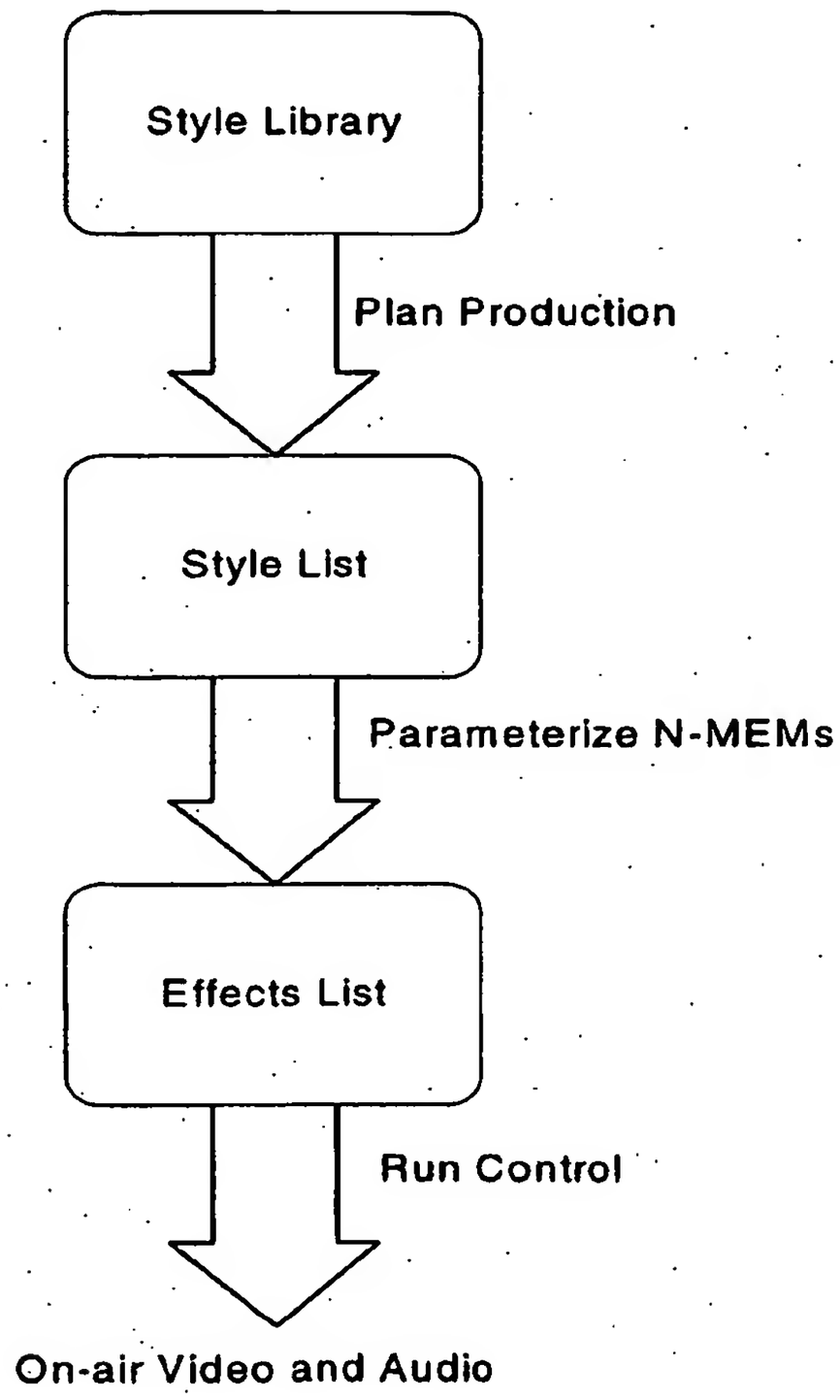
It is a program's Director or other more technical personnel who complete the process of N-MEM parameterization. Parameterization involves the selection of the specific E-MEMs in the N-MEM to be used in the particular use of the Style. It is these parameterized N-MEMs which are placed into the Effects List. Such an N-MEM is called a parameterized N-MEM to distinguish it from a library N-MEM.

Parameterization is made easy by not dealing with abstract entities such as E-MEM numbers, but by dealing with named resources which are all in the system resource map. For example, when the Producer selects "Jane" as the performer, the list of camera E-MEMs is constrained to a smaller set. When the Director selects camera-2 for the style to shoot Jane, then the parameterization is complete and the camera E-MEM has been selected. Also, when the switcher E-MEM is recalled, because the camera has been selected, the correct input is selected on its background bus. Other examples of parameterization are, placing text such as "Live from LA" as the title for a CG, selecting which clip to play from a video server and on which output channel, which VTR machine to use for a specific tape, and which remote feed channel a live microwave transmission will come from, etc.

Once parameterization is complete, the effects list is ready to go on-air. One element of the described invention is a rules checker, which in the background checks that each story element has an associated Style, and that each Style has it's N-MEMs fully parameterized. Hours before the show starts, the rules checked will indicate much is

incomplete. Ideally, when the show starts, there should be no problems indicated. The rules checker also checks for resource conflicts, and local station policies.

When the Effects List is ready to go on-air it is passed on to **Run Control**. Play-out of the event list is a manual operation. At its most basic, the user presses the 'Take' button. The current N-MEM is released, the next N-MEM goes on air, and the N-MEM after that is previewed. Before an N-MEM goes on air, it should be in the ready state – and the N-MEM is ready when all the controlled devices are cued. There is an E-MEM for each controlled device and each E-MEM is cycled through the states: idle, cueing, ready(cued), active (on air or on preview), and released. The N-MEM's state is a rollup of the E-MEM states, and it cycles through the states: idle, cueing, ready(cued), on-preview, on-air, and released. This is all described in much more detail in the (draft) Product Technical Specification.



One aspect of importance is to note that although what goes on air is manually paced by pressing 'Take', the cueing of devices is performed automatically. This is different from

other systems which require the cueing of a device (such as a camera move) to be manually pre-programmed onto a timeline. When an E-MEM is released, Tsunami scans forward through the event list for the next N-MEM which has an E-MEM for the same device, and brings this into the cueing state. So for example, as soon as the camera E-MEM is released from its last usage, the next E-MEM in the Effects List that uses this camera is found, and that E-MEM is cued, to bring the camera into its next position, ready for going on air.

Besides a simple 'take', Run Control supports operations which 'float' (skip) an N-MEM, 'take audio' to bring on the audio in advance of video, to 'hold audio' after the N-MEM is released, to 'roll' tapes and DDRs, and more. All this too is described in the Product Technical Spec.

One further consideration is the need to 'tweak' the controlled devices after their E-MEMs have been recalled. For example, the camera might have been moved to the correct position, but the performer is slightly out of position; in this case the camera needs to be moved. Another example would be the performer talking more quietly than expected and the gain on his microphone needing to be adjusted. Although this tweaking can be performed 'blind', it is best done when the video or audio is on preview, or even on-air. Control surfaces (GUIs and physical control panels) are provided for making such adjustments, which are stored as deltas to the E-MEM. What is significant is that the operator has the choice of having this delta automatically applied each time the resource is used in an E-MEM. So if the "talent-left" Style had to have the camera position and focus adjusted slightly, each time the camera goes to the same position, the same delta is applied. Similarly for the use of a microphone.

This concludes the description of Styles as used in ordered (scripted) shows. For unscripted shows, or shows with unscripted sections, the Style Box is used. The Style Box consists of buttons (on a GUI or physical control panel) each of which is associated with a Style. Each Style is parameterized when it is placed in the Style Box. Run Control operations associated with these styles are to:

- cue the N-MEM - making it ready for air
- making the N-MEM next - so it appears on video and audio preview
- making the N-MEM current - so it is taken to air

Combination operations 'cue and next' , 'cue and current (on-air)' are also supported.

The purpose of the Style Box is to allow the operator to quickly prepare a style and take it to air. A typical system would have a Style Box with 20 buttons, with a total of 10 pages of styles capable of being placed onto these buttons, making 200 Styles containing parameterized N-MEMs. However, to be used effectively the 20 exposed Styles under the operator's finger tips should be the ones most likely to be used on an immediate basis as the live show progresses. Other operations used to support the Style Box are:

- bringing a Library Style into the Style Box and parameterizing it
- re-parameterization on-the-fly of a Style in the Style Box
- moving Styles from one bank to another in the Style Box

Now that the basic inventions are described, this document shows how it is used for an Integrated News Production System, named **Tsunami**. The described inventions are embodied as a control system running on a computer. In common with existing news production systems, this control system (Tsunami) receives a 'running order' for the show from a NRCS (such as iNews and ENPS). What is unique about this system is the way it works. Tsunami perceives received running orders as Style Lists and so converts these running-order/style-lists into an Effects lists, i.e. ordered sequences of N-MEMs. Tsunami does not employ timelines, where the items in the timeline have durations, nor does it employ macros, which are stored (learned) sequences of commands to be sent to the connected devices.

In the workflow of producing a news program, stories or slugs are entered into the rundown, and placed in the order they will be shown. The producer associates a Tsunami Style with each story in this rundown by employing the **Tsunami software ActiveX Plug-in** (TAP) to the newsroom computer system. The TAP communicates with the Tsunami Controller to retrieve a list of the contents of the Style Library and offers the choice of Styles to the Producer. The TAP is also active in extracting information from the scripts and rundown which describes which news anchor is reading which story, and text for graphics. This information is used to start parameterization of the N-MEMs as already described.

The running order of scripts (i.e. the Style List) is transferred to Tsunami via variety of means including FTP and MOS protocols. The Director (and/or Producer) can proceed to parameterize the N-MEMs either using the TAP on the NRCS or using Tsunami's own GUI. As described, the rules checker ensures everything is correctly parameterized. Tsunami generates an Event List for each rundown (i.e. for each news program).

Tsunami's GUI shows the event list, the state of each N-MEM, and the state of the E-MEMs. Once Run Control is activated, the GUI indicates progress through the Effects List. Additionally the GUI highlights any anomalous conditions which require manual intervention, such as an N-MEM not being cued because the source material is not available or the physical device has failed. In this case the operator could skip over (float) the story, and optionally come back to it later when the source material becomes available.

Another feature unique to Tsunami is that unlike other Integrated News Production Systems, Tsunami accepts new running orders and modifications to existing running orders at all times from the NRCS, even when the show is on-air. It is capable of doing this, because the scripts forming the running orders are received with embedded references to Tsunami Styles. Further, any errors or omissions in parameterization of the N-MEMs within these Styles, are immediately flagged by the Rules Checker.

One last point to note, is that not all the devices controlled by Tsunami have their own internal E-MEM mechanism. Some devices do, others do not. Where the device has its own E-MEM mechanism, Tsunami's E-MEMs are references to the E-MEM information

stored in the device. Where there is no E-MEM mechanism in the device, Tsunami acts as a proxy for the device and stores the information locally when the E-MEM is learned, and then sends the state information back to the device when the E-MEM is recalled.